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**Consumer  
Preference  
For a 6-to-1  
APPLE JUICE  
Concentrate**

UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
Marketing Research Division

MARKETING RESEARCH REPORT NO. 343



## PREFACE

This study is one of a series of consumer preference studies made to determine the qualities and characteristics of agricultural products which appeal most to consumers. It is part of a broad program of research aimed at expanding markets for farm products.

The study was conducted under the general supervision of Trienah Meyers of the Market Development Branch, Agricultural Marketing Service.

Special acknowledgment is due R. K. Eskew, Paul W. Edwards, and Nelson Eisenhardt of the Eastern Utilization Research and Development Division, Agricultural Research Service, who provided technical advice and assistance in planning and conducting the research. The EURDD also provided the concentrate used in the experiment.

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## SUMMARY

This report presents the results of a study conducted to determine the relative consumer preference for a 6- to- 1 apple juice concentrate, a new product developed by the United States Department of Agriculture, and two high-grade single-strength apple juices available on the commercial market.

The concentrate (reconstituted to single strength) and the single-strength juices were delivered in quart bottles labeled only as apple juice, one juice at a time in a random manner, to a panel of consumer households for 3 successive weeks. A 10-point rating scale was used to obtain preference ratings of all members of the households 16 years of age and over for each juice. Interviews were conducted with homemakers after the ratings were made to obtain reasons for the rating given each juice.

Results of the study showed that the mean preference rating of the concentrate was significantly higher than the mean ratings given the two single-strength juices with which it was compared. Further experimentation with the concentrate reconstituted at home resulted in essentially the same preferential position for the new product with respect to other juices.

Most of the reasons given for liking each juice referred to flavor. The proportion of respondents who spoke favorably of the flavor of the concentrate was not significantly larger than the proportion who spoke favorably of this characteristic of the commercial juices, but the direction of the difference was consistent with the order of preference obtained with the rating scale.

When reasons homemakers gave for not liking the test juices are considered, the concentrate again appears to have an advantage over the commercial juices with which it was compared. The proportion of respondents who reported there was nothing they disliked about the concentrate was significantly larger than the proportions who made this statement about the single-strength juices.



## CONSUMER PREFERENCE FOR A 6 - TO - 1 APPLE JUICE CONCENTRATE

J. Scott Hunter, project director  
Market Development Branch

### INTRODUCTION

Apple juice canned or bottled in the usual way loses some of the characteristic flavor of fresh juice because of partial evaporation of the aroma. A process has been developed at the Eastern Utilization Research and Development Division of the Agricultural Research Service by which this aroma is recovered in essence form and later restored to a high-density concentrate. When reconstituted, the product resembles a high grade, clarified, single-strength juice and has the aroma of freshly pressed cider.

The developmental work has reached the stage where information is needed on consumer preferences for juice reconstituted from the concentrate relative to single-strength juices already available. This report is based on research initiated to determine whether further developmental work is needed to improve the suitability of the high density concentrate, or whether the product in its present form has a reasonable chance for success if processed on a commercial scale.

The report presents the results of a preference experiment in which consumers were asked to rate this full-flavor apple juice concentrate in comparison with two high-grade commercial juices already available on the market. The results will be of interest to apple processors who may consider production of a high-density concentrate.

### The Sample

The study was conducted with a panel of consumer households in Pittsburgh, Pa., selected in such a way as to be representative of a wide range of socio-economic characteristics. Thirty-three clusters of twelve households each were drawn by area probability sampling techniques. Within these clusters all households were eligible to participate in the study except those in which (1) there were no facilities for refrigerating foods, (2) a language difficulty or an educational handicap prevented the homemaker from understanding the rating procedure, or (3) the homemaker was unwilling to agree to participate throughout the 5 weeks of the study. Of the eligible households in each cluster, six were recruited to take part in the experiment, and all members of the households 16 years of age and over were requested to taste and rate each of the juices. Differences between participating and nonparticipating households are shown in the Appendix and in tables 1-3.

Field work on the project was conducted between September 8 and October 10, 1958.

### The Experimental Design

Because the new juice, as a concentrate, looked different and required different handling before using, it was considered necessary to reconstitute it before presentation to the panel so that the first ratings reflected a reaction to the juice itself and not the form or the apparent newness of the product.

During the first 3 weeks of the experiment, the concentrate reconstituted to single strength was rated in comparison with two commercially available single-strength juices.

Each of the participating households was randomly assigned to one of the treatment groups represented by the following diagram:

	Treatment Group					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
Week 1 -	A	A	B	B	C	C
Week 2 -	B	C	A	C	A	B
Week 3 -	C	B	C	A	B	A

The letters in the diagram represent the three different juices used in the study, the A standing for the concentrate after reconstitution and B and C for two commercial brands. The three test juices were thus rated by all the subjects and in all possible sequences.

After testing for the relative preference for the juices in single strength form it was considered desirable to provide a measure of consumer satisfaction with the product in the form in which marketing is anticipated. Therefore, in the fourth week a randomly selected half of the subjects again rated the concentrate reconstituted before delivery to the test households and the other half rated it after reconstitution by the homemaker.

### Preparation of Test Materials

The need to conceal the identities of the test juices by reconstituting and rebottling created the problem of delivering the experimental material with the assurance that the juices remained in good condition. To meet this problem the concentrated apple juice and water for reconstitution were chilled overnight to a temperature of 35° F. The reconstitution and rebottling of the test material was done on the morning of the day when delivery was to be made and the juices were stored in insulated paper bags cooled by a chemical refrigerant until delivered. The juices were refrigerated in the test household, under supervision of the interviewer, immediately upon delivery. This usually took place within 1 to 3 hours after reconstitution and rebottling.

Each batch of the reconstituted concentrate was tested with a hydrometer to assure the proper Brix-acid ratio. Training in the accurate reconstitution of the concentrate was under the supervision of a food chemist from the Eastern Utilization Research and Development Laboratory of the Agricultural Research Service.

The juices were delivered in 32-ounce (quart) clear glass bottles. In the last phase of the experiment the sevenfold concentrate was delivered in 4.7-ounce cans which, when reconstituted, produced a quart of juice.

### Test Procedures

Participants were given no indication of the identity of the juices they were asked to rate, nor were they told that the Department was primarily concerned with measuring their satisfaction with the concentrate. To conceal this objective the reconstituted concentrate and the single-strength juices were delivered to the test households in identical bottles labeled with a coded serial number to indicate which juice was being rated. The serial number contained five digits with the identifying digit in the tens position.

To provide the members of the panel households with a means of expressing their opinions of the juices they were rating, a 10-point "hedonic" scale was used (figure 1). Interviewers explained the rating procedure to the homemaker in each household and the following instruction was printed at the top of the scale card:

"From the rating scale you will see that your opinion of this apple juice may be expressed anywhere from "Dislike Extremely" up through "Like Extremely." Put an "X" in the one block that best expresses your opinion of this apple juice."

In analyzing the results, the points on the scale were assigned values of 1 at the bottom up to 10 at the top.

In addition to the preference ratings obtained from the hedonic scale, information on the homemakers' reasons for liking and disliking each juice and her reasons for the rating she gave were obtained by an interview conducted at the time the rating scales were collected.

Rating Scale Used to Measure Preferences	
Like Extremely	
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
Dislike Extremely	

Figure 1

Selection of the Juices for Comparison

To provide a rigorous test of consumer preference it was desirable to have the concentrate compared with one or more high-grade commercial brands. The selection of the commercial juices was made on the basis of recommendations from apple specialists of the Eastern Utilization Research and Development Division and with the concurrence of a representative of an apple processors' association.

Since two commercial brands were to be used, it was necessary that they be distinctly different from each other. To determine whether or not the selected juices were discriminably different, triangle tests were administered to 40 untrained tasters. Each subject was given three samples of apple juice. Two of the samples were of the same juice and the third was different. Subjects were asked to taste each juice and to indicate which of the three was different. Results of this test indicated that the two selected juices were easily discriminable. Only two subjects failed to make the correct identification, and it seems likely that these two errors were due to confusion rather than to an inability to detect a difference between the two brands.

The following tabulation lists the Brix and acid characteristics of the commercial juices and the concentrate:

	<u>°Brix</u>	<u>Acid Grams per 100 ml.</u>	<u>Brix-acid ratio</u>
Concentrate -----	12.5	0.40 - 0.50	24 - 31
Commercial Juice B ---	16.1	0.35	46
Commercial Juice C ---	12.5-13.2	0.63 - 0.67	19 - 21

The concentrate is thus in between the two commercial juices in its tartness-sweetness characteristics; it is less sweet than commercial juice B and somewhat sweeter than commercial juice C.

## RESULTS

Both the preference scores obtained from the hedonic scale and the reasons the homemakers gave for rating each juice as they did indicate that, as far as taste was concerned, the concentrate held a competitive advantage over the two commercial juices with which it was compared.

### The Preference Scores

The mean preference scores for the concentrate and the two commercial juices are presented graphically in figure 2. These scores show that the concentrate was clearly preferred over one of the commercial juices and slightly preferred over the other. These differences are stable at the 1 percent level of significance (table 4).

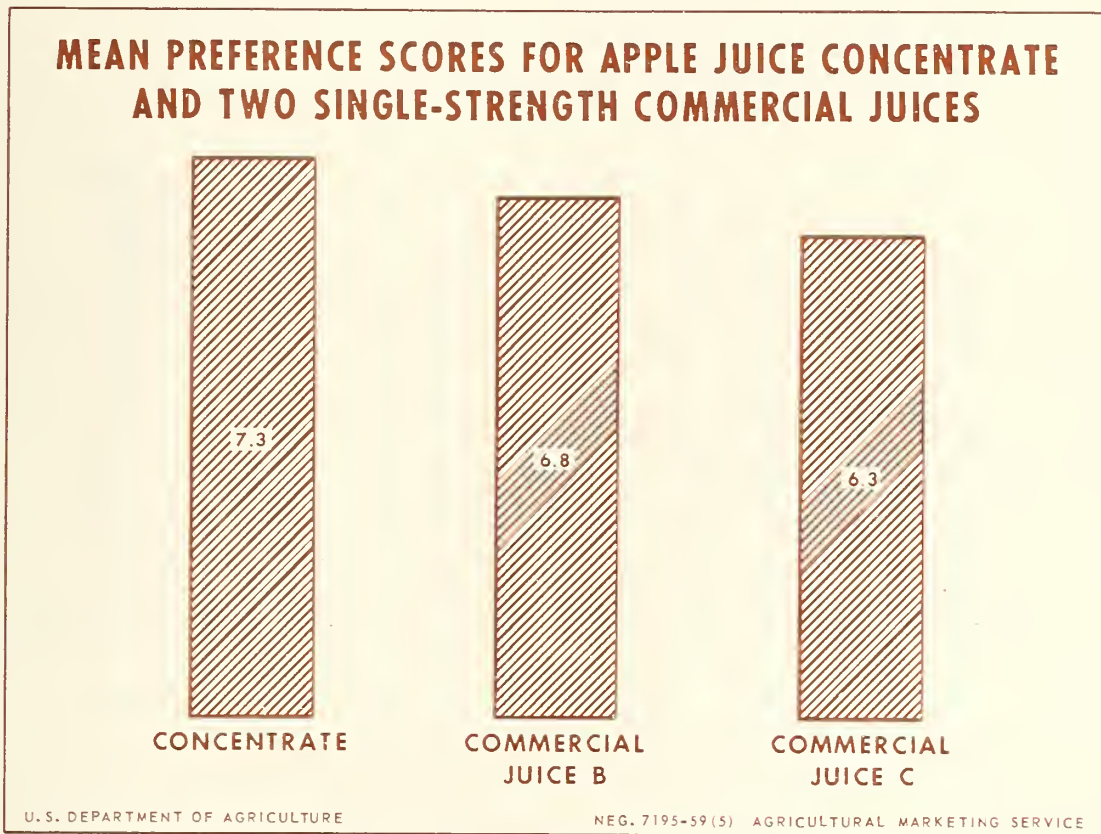


Figure 2

The three juices maintained the same relative position throughout the 3 weeks of the study when comparisons were being made. Since the juices were rated by different groups of judges each week, this consistency of position indicates a high degree of agreement about the order of preference among the different groups of judges (table 5).

Examination of the distribution of mean household scores shows that the concentrate and commercial juice B showed a clustering at 9 or higher, with a larger proportion of households giving the highest rating to the concentrate. The scores for commercial juice C, on the other hand, have one peak between 8 and 9 and another between 5 and 6 (figure 3).

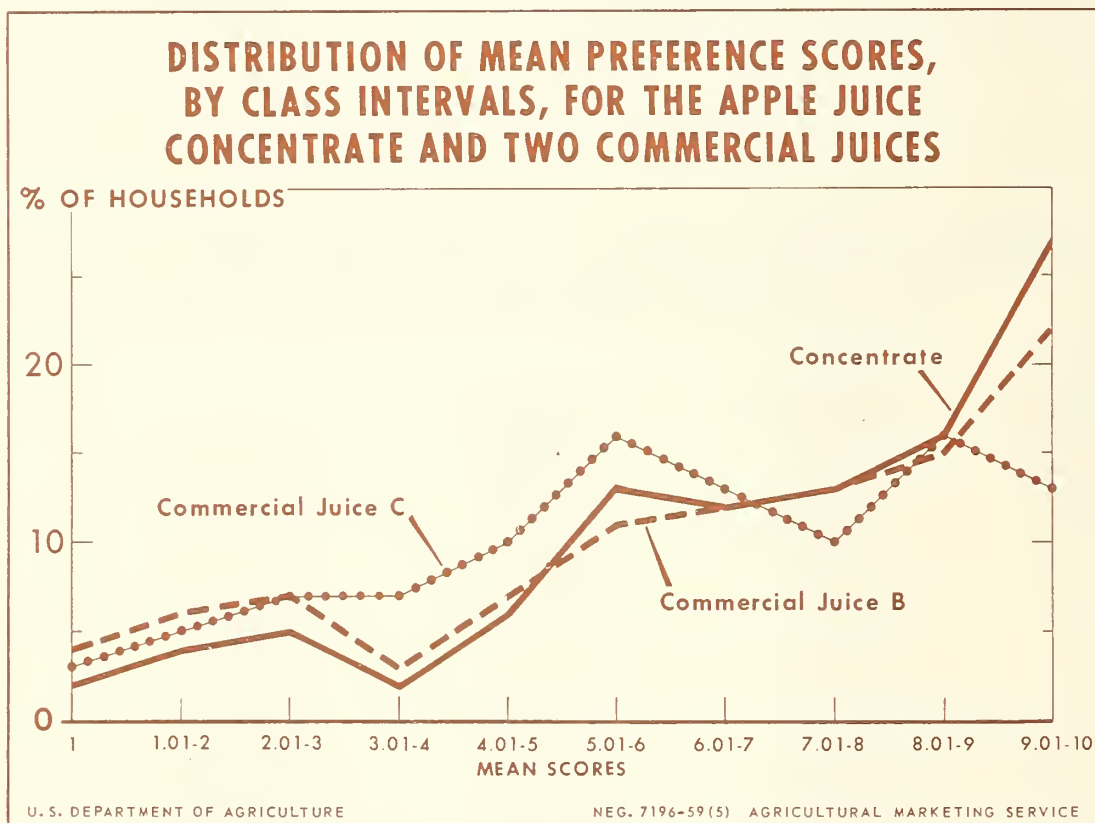


Figure 3

In addition to the preference ratings which were obtained from household members 16 years of age and over, information on the opinions of the younger members was obtained indirectly by asking the homemakers whether or not the younger children who did not use the rating scale seemed to like the juice that was being judged. The responses to this question placed the test juices in the same rank order as the scale did for the adults. While the homemakers' estimates of the opinions of the younger members of the household may not be completely independent of their own opinions, these estimates have an important influence on purchase decisions.

Further analysis of the test results shows that the only source of significant variation other than the differences between juices was associated with differences between households. The order in which the juices were rated and the week of the experiment in which they were rated had no significant effect on the ratings (table 5 and figures 4 and 5).

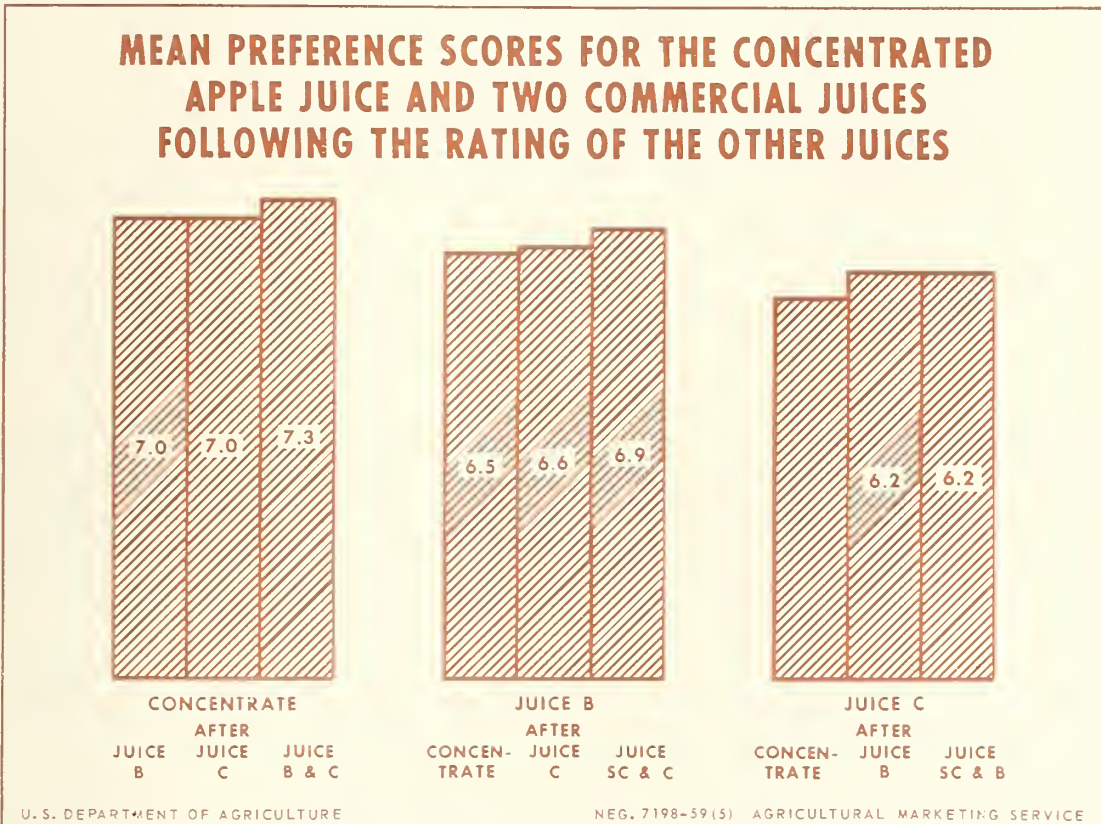


Figure 4

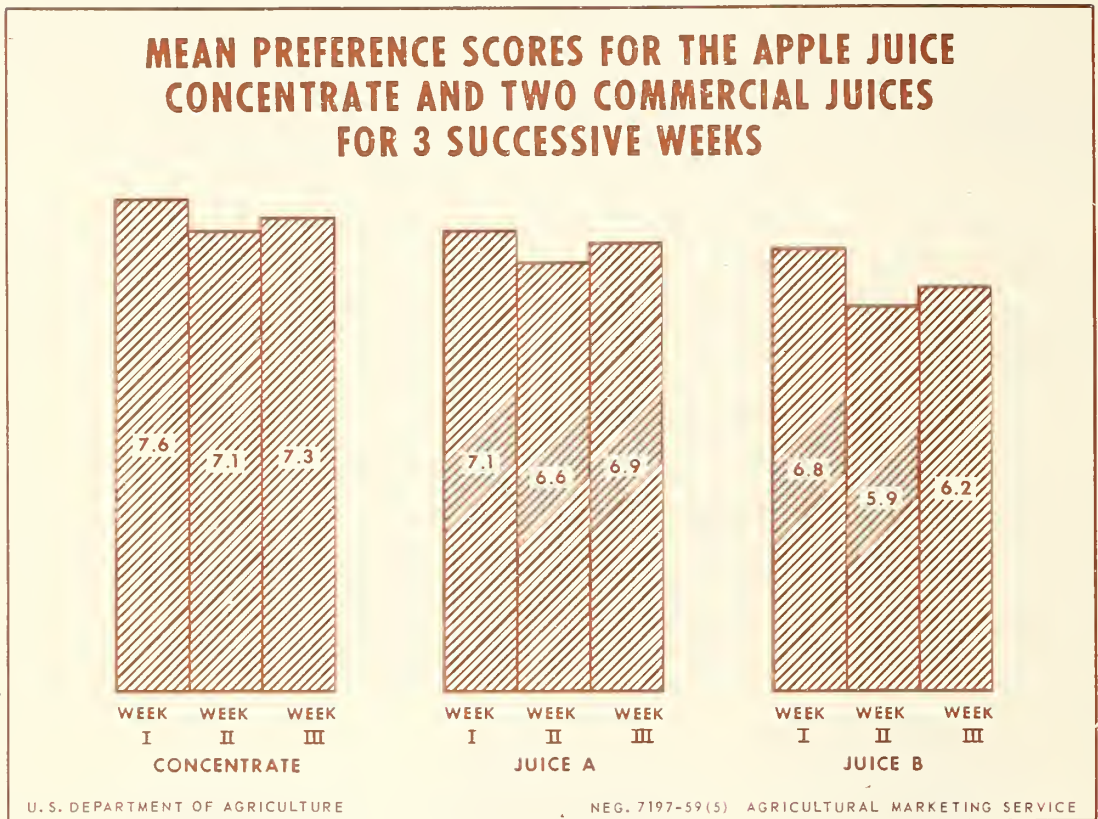


Figure 5

This last result is of special interest, since it suggests an absolute rather than a relative difference in the preferences for the three juices. It is also somewhat surprising, since the theory of the method of single stimuli used in this experiment is that the series forms the standard in terms of which judgments are made. Or, in other words, the judgment of one stimulus will be made in comparison with the judgment of others.

Two consequences of this characteristic of the method have frequently been observed in laboratory taste testing and were noted in one previous study published by the Agricultural Marketing Service. <sup>1/</sup> The first of

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<sup>1/</sup> U. S. Agricultural Marketing Service. Consumer Preferences for Frozen Peas in Relation to Standards for Grades. U. S. Dept. Agr. Mktg. Res. Rpt. 280, 19 pp., illus., 1958.



these consequences is referred to as the "contrast" effect: A high-quality sample tends to be rated higher when it follows an average quality sample, and an average quality sample tends to be rated lower when it follows a high quality sample. A second effect of the method of single stimuli is related to time: Samples presented first tend to be given a higher rating than samples presented later in the experiment. Neither of these effects appeared to influence significantly the preference ratings given the test juices. Instead, the mean preference scores showed only random fluctuations from week to week.

### Reasons for Preferences

At the time the rating scales were collected from the test households the homemakers were asked to explain why they had rated each juice as they had. Respondents were asked, "What was it about the apple juice I left last week that made you decide to give it the rating that you did?" This question wording was completely non-directive. However, if the reply was entirely favorable respondents were asked specifically if there was anything that they disliked and if the reply was entirely unfavorable they were asked if there was anything that they did like.

Most of the reasons given for liking each of the test juices were related to flavor. The proportion of homemakers who spoke favorably of the "natural apple taste" of the concentrate appeared somewhat larger than the proportions who spoke favorably of this characteristic of the two commercial juices. Although this difference is not statistically significant, the direction of the difference is suggestive and is consistent with the order of preference obtained with the rating scale. Furthermore, the rank order of the proportions who mentioned the "sweetness" of each juice corresponds with the order of the juices ranked in terms of their Brix-acid ratios (table 6).

When the reasons homemakers gave for not liking each of the test juices are considered, the concentrate again appears to have some advantage over the commercial juices with which it was compared. The proportion who complained that the concentrate was too sweet was smaller than the proportion who expressed this complaint about the sweetest of the commercial juices; and the proportion who complained about its tartness was smaller than the proportion who said they felt the most tart of the competing juices was too tart (table 7).

Apple juice had been served in only 2 in 10 of the cooperating households during the year preceding the study. In about 4 in 10 of the nonusing households the reason was a dislike of the beverage (table 8). It is, therefore, of considerable importance to note that nearly 6 in 10 of the homemakers reported only favorable opinions of the concentrate. In comparison, fewer than half of these same respondents were completely satisfied with the single-strength juices (table 6).

Most of the homemakers served the test juices to their families within one day of delivery, but about 1 in 5 had some left at the end of a week when

the interviewer returned to collect the ratings. Any change in the quality of the juices that may have occurred in this period, however, would not have influenced the ratings, since the ratings were made the first time each juice was tasted. Furthermore, interviewers were instructed to see to it that any remaining juice was disposed of so that no direct comparisons could be made.

### Comparison of the Concentrate Reconstituted Before Delivery and in the Home

In the fourth week of the experiment, when one-half of the households rated the concentrate reconstituted before delivery and the other half rated it after it was reconstituted by the homemakers, no difference was found in the mean preference ratings given to each form of the juice, nor were the mean scores significantly different from the mean scores given the concentrate when it was rated the first time (table 9). Furthermore, the reasons the homemakers gave for scoring each form of the juice as they had were quite similar to the reasons they gave earlier in the experiment when they first rated the test product (tables 6 and 7).

Since the participants in the experiment were not aware that they were asked to rate the concentrate a second time, the fact that there was no difference in the ratings between the first three weeks and the last week of the study may also be regarded as a measure of the reliability of the test procedures. That is, it shows that the method provided stable, reproducible expressions of the respondents' opinions of the test materials.

### Other Measures of Satisfaction

One other measure of satisfaction with the concentrate was obtained by asking the homemakers if they would buy such a product if it were sold in stores where they shopped. Those who said they would were also asked if they would buy this juice even if it cost a little more than other kinds.

In reply to the first of these questions, 7 homemakers in 10 said they would buy the concentrate if it were available, and, of those who would buy it, nearly all said they would be willing to pay a little more for the concentrate than they would pay for the single-strength apple juice with which they were familiar (table 10).

In interpreting these findings it should be borne in mind that some upward bias may have resulted from the cordial relationship which the interviewers had cultivated with the respondents during the preceding 5 weeks. However, every effort was made to impress the respondents with the importance of candid expressions of their opinions. Even if some allowance is made for bias, it is probable that the majority of these homemakers would be interested in serving the concentrate from time to time. The findings have increased significance when it is recalled that most of the participants in the experiment were not regular users of apple juice.

Although some members in 3 out of 4 user households (households normally using apple juice) were reported to like the juice "especially well," in the other fourth of the user households there were members who did not drink it at all (tables 11 and 12). Of the 27 respondents who said they would not buy the concentrate if it were commercially available most were not users of apple juice; only 8 had used it in the year preceding the study.

One final question concerned the ease of handling the small 4.7-ounce can in which the test product was packed. Homemakers who reconstituted the concentrate were asked, "Did you find it was inconvenient in any way to mix apple juice from the concentrate?" Fewer than 1 respondent in 10 experienced any difficulty in preparing a single-strength juice from the concentrate. These homemakers merely felt the task of mixing was a minor nuisance compared to pouring a ready-prepared juice from a can or bottle.

The finding that 9 out of 10 of the homemakers reported no inconvenience connected with reconstitution of the concentrate may be compared with the finding that about half of the respondents reported that they preferred to use canned or bottled juices rather than frozen concentrates. The chief reasons were that canned or bottled juices were more convenient to use (table 13).

APPENDIX

Characteristics of the Subjects

Probability sampling procedures were used in the selection of the households from which the participants in the experiment were drawn, but these households cannot be regarded as representative of all consumers, since many people are either unwilling or unable to participate in a study of 5 weeks' duration. There are, however, no a priori reasons for believing that the circumstances or personality traits that prevent a person from participating are related to his ability to evaluate the quality characteristics of a product.

Nevertheless, it is of interest to compare the background characteristics of families who participated with characteristics of families who did not participate. As the following tabulation shows, participants proved to be younger, to have higher incomes, and to have had more years of education than non-participants. They were also more likely than the non-participants to have used apple juice one or more times in the year preceding the study.

Table 1.--Relationship between participation in the preference experiment and background characteristics of the households in the sample

Background characteristics	Participants	Non-participants	Total homemakers in original sample
	<u>Percent</u>	<u>Percent</u>	<u>Number</u> <u>1/</u>
Age:			
Under 45 -----	77	23	173
45 and over -----	49	51	143
Income:			
Under \$3,000 -----	55	45	77
\$3,000 - \$5,999 -----	70	30	127
\$6,000 and over -----	78	22	64
Education:			
Grammar school -----	54	46	95
High school -----	63	37	192
College -----	77	23	31
Use of apple juice:			
Users -----	85	15	52
Nonusers -----	58	42	265

1/ Numbers add to different totals because the information was not ascertained for some respondents.

Participating households also differed from nonparticipating households with respect to their use of seven other fruit juices about which the homemakers were questioned. As the following table shows, larger proportions of the participating than of the nonparticipating households had used each juice at least once in the year preceding the study:

Table 2.--Use of seven fruit juices by households in the sample in the year preceding the study

Juice and when used	Participants		Nonparticipants	
	Percent	Percent	Percent	Percent
<b>Orange</b>				
Used in past year -----		85		79
With meals -----	27		36	
Between meals -----	5		11	
Both -----	53		32	
Not used in past year -----		15		20
Not ascertained -----		--		1
Total -----		100		100
Number of households -----		198		123
<b>Grapefruit</b>				
Used in past year -----		50		39
With meals -----	15		16	
Between meals -----	8		8	
Both -----	27		15	
Not used in past year -----		50		61
Not ascertained -----		1/		--
Total -----		100		100
Number of households -----		198		123
<b>Lemon</b>				
Used in past year -----		37		27
With meals -----	8		4	
Between meals -----	11		15	
Both -----	18		8	
Not used in past year -----		63		72
Not ascertained -----		--		1
Total -----		100		100
Number of households -----		198		123
<b>Lime</b>				
Used in past year -----		12		7
With meals -----	2		1	
Between meals -----	5		4	
Both -----	5		2	
Not used in past year -----		88		93
Total -----		100		100
Number of households -----		198		123
<b>Grape</b>				
Used in past year -----		54		44
With meals -----	6		8	
Between meals -----	19		20	
Both -----	29		16	
Not used in past year -----		46		56
Total -----		100		100
Number of households -----		198		123
<b>Pineapple</b>				
Used in past year -----		64		46
With meals -----	14		11	
Between meals -----	15		14	
Both -----	35		21	
Not used in past year -----		36		52
Not ascertained -----		1/		--
Total -----		100		100
Number of households -----		198		123
<b>Tomato</b>				
Used in past year -----		76		59
With meals -----	31		32	
Between meals -----	8		5	
Both -----	37		22	
Not used in past year -----		24		41
Total -----		100		100
Number of households -----		198		123

1/ Less than 1 percent

Even though the subjects in this experiment were not representative of all consumers, they did, nevertheless, represent households of a wide range of background characteristics. The following tabulation shows the composition of the sample in terms of the age, income, and educational groups included:

Table 3.--Range of background characteristics of households in the sample

Background characteristics	Participants	Nonparticipants
	<u>Percent</u>	<u>Percent</u>
<u>Age</u>		
Under 45 -----	63	39
45 and over -----	35	59
Not ascertained -----	2	2
Total -----	100	100
Number of homemakers -----	198	123
<u>Family income</u>		
Under \$3,000 -----	21	28
\$3,000 - \$5,999 -----	45	31
\$6,000 and over -----	25	11
Not ascertained -----	9	30
Total -----	100	100
Number of homemakers -----	198	123
<u>Education</u>		
Grammar school -----	26	36
High school -----	61	58
College -----	12	5
Not ascertained -----	1	1
Total -----	100	100
Number of homemakers -----	198	123
<u>Race</u>		
White -----	91	93
Other -----	9	7
Total -----	100	100
Number of homemakers -----	198	123

T A B L E S

Table 4.--Analysis of variance of preference scores for a sevenfold apple juice concentrate and two single-strength commercial juices

Source of variation	Degrees of freedom	Sums of squares	Mean squares	F
Total -----	543	3,755.25		
Juices (including order) ----	2	95.23	47.61	7.79**
Time -----	2	35.33	17.67	2.89
Order (excluding juice) ----	5	1.04	.21	--
Households -----	187	1,503.89	8.04	1.32*
Experimental error -----	347	2,119.76	6.11	

\*\* Significant at the 1 percent level.

\* Significant at the 5 percent level.

Table 5.--Mean preference scores for a sevenfold apple juice concentrate and two single-strength commercial juices rated for 3 successive weeks

Week	Concentrate		Juice B		Juice C	
	Mean score	Number	Mean score	Number	Mean score	Number
First -----	7.6	62	7.1	63	6.8	63
Second -----	7.1	62	6.6	63	5.9	63
Third -----	7.3	64	6.9	43	6.2	61

Table 6.--Reasons homemakers gave for liking each juice

Reasons	Comparison of the concentrate with two commercial apple juices			Comparison of the concentrate reconstituted	
	Concentrate reconstituted	Commercial juice B	Commercial juice C	Before delivery	In the home
	Percent	Percent	Percent	Percent	Percent
<u>Flavor</u>					
Natural, apple taste ----	36	29	28	39	31
Sweet -----	12	16	6	10	7
Not too sweet or too sour	9	10	9	11	8
Not too sweet -----	8	5	8	5	7
Good taste -----	8	11	7	6	8
Mild -----	2	2	3	9	2
Tart, tangy -----	2	1	2	3	1
No aftertaste -----	2	2	1	1	--
Apple cider taste -----	1	2	1	3	1
Strong flavor, stronger, rich -----	1	1	--	--	2
Miscellaneous flavor ----	--	1	1	--	--
<u>Color</u>					
Clear, amber color -----	15	2	5	26	24
Miscellaneous color -----	1	--	--	1	--
<u>Consistency</u>					
Thin, not too thick -----	4	1	2	3	2
Had more body to it -----	2	7	3	1	2
Not too thick -----	1	1	--	--	--
<u>Aroma</u>					
Smells like fresh apples	1	2	2	--	1
<u>Convenience</u>					
Convenient to store -----	--	--	--	--	11
Miscellaneous-----	--	--	--	--	1
<u>General</u>					
Thirst quencher -----	3	6	5	1	2
Good as laxative -----	2	2	4	3	--
It is a refreshing drink	2	2	2	1	1
Miscellaneous general ---	--	1	--	3	1
<u>Just like it</u> -----	2	1	2	2	--
<u>Nothing liked</u> -----	22	27	32	18	21
<u>Not ascertained</u> -----	1	--	1	--	--
Number of cases ----	190	171	191	94	90



Table 7.--Reasons homemakers gave for not liking each juice

Reasons	Comparison of the concentrate with two commercial apple juices			Comparison of the concentrate reconstituted	
	Concentrate reconstituted	Commercial juice B	Commercial juice C	Before delivery	In the home
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
<u>Flavor</u>					
Watery, flat -----	15	5	15	16	20
Too sweet -----	12	22	6	12	17
Too tart, sour, bitter --	6	6	21	5	7
Not sweet enough -----	3	2	5	2	2
Not true apple taste, not strong apple taste-----	2	5	5	5	8
Leaves an aftertaste ----	2	2	3	1	1
Cider taste -----	1	2	3	--	3
Just didn't like the taste -----	1	1	1	1	--
Miscellaneous taste ----	1	1	1	--	--
<u>Consistency</u>					
Has no body, thin in texture -----	7	2	3	2	2
Too thick, too heavy, pulpy -----	1	8	5	1	1
<u>Color</u>					
Didn't like the color, cloudy -----	1	20	11	1	1
<u>Aroma</u>					
Didn't like the smell ---	--	1	1	--	--
<u>Convenience</u>					
Inconvenient to prepare -	--	--	--	--	3
<u>General</u>					
Didn't quench thirst ----	1	--	1	1	--
Miscellaneous general ---	1	--	--	--	3
Just didn't like it -----	1	1	2	1	--
<u>Nothing disliked</u> -----	58	46	41	64	48
<u>Not ascertained</u> -----	1	--	1	--	--
Number of cases ----	190	171	191	94	90

Table 8.--Usual practice regarding use of apple juice in the test households and reasons for nonuse

Use and reasons for nonuse	Homemakers	
	<u>Percent</u> <u>1/</u>	<u>Percent</u>
Use -----		20
Do not use -----		80
Habit and unfamiliarity -----	62	
Disliked by adult -----	26	
Disliked by children -----	16	
Health reasons -----	5	
Price -----	2	
Miscellaneous -----	<u>2/</u>	
Total -----		100
Number of homemakers -----	154	196

1/ Percentages add to more than 100 because some respondents gave more than one reason.

2/ Less than 1 percent.

Table 9.--Mean preference scores for a sevenfold apple juice concentrate reconstituted before delivery and in test households

	Reconstituted before delivery	Reconstituted at home
Mean score -----	7.5	7.2*
Number of households -----	98	85

\* Difference is not significant at the 5 percent level.

Table 10.--Replies to the questions, "If an apple juice concentrate were sold in the stores where you shop, do you think you would buy it?" and (asked of those who said, "no") "Why wouldn't you?"

Replies	Homemakers	
	<u>Number</u> <sup>1/</sup>	<u>Percent</u>
Yes -----		68
No -----		30
Don't like the taste -----	11	
Inconvenient to mix, prepare -----	6	
Don't like texture, consistency -----	2	
Just don't like it -----	8	
Miscellaneous -----	1	
Not ascertained -----	1	
Don't know -----		2
Total -----		100
Number of homemakers -----	27	156

<sup>1/</sup> The numbers add to more than 27 because some respondents gave more than one reason.

Table 11.--Replies to the questions, "Do any members of your family like apple juice especially well?" and (if "yes") "Which ones?"

Replies	Household	
	<u>Percent</u>	<u>Percent</u>
Yes, some like especially well -----		75
Adults -----	32	
Children -----	25	
Children and adults -----	16	
Not ascertained -----	2	
No, none like especially well -----		25
Total -----		100
Number of households -----		198

Table 12.--Replies to the questions, "Do all members of your family drink apple juice?" and (if "no") "Who doesn't drink it?"

Replies	Household	
	<u>Percent</u>	<u>Percent</u>
Yes, all members drink apple juice --		67
No, not all members do -----		33
Adults only do not -----	24	
Children only do not -----	2	
Children and adults -----	7	
Total -----		100
Number of homemakers -----		198

Table 13.--Reasons homemakers gave for preferring frozen fruit juices and canned and bottled fruit juices

Reasons	Frozen	Canned or bottled
	<u>Percent</u> <u>1/</u>	<u>Percent</u> <u>1/</u>
Natural, true fruit flavor, fresh -----	64	20
Convenient to store -----	27	12
No canny, metallic taste -----	19	--
Convenient to prepare, use, no mixing --	9	35
More flavor, stronger flavor -----	9	18
More convenient to carry -----	4	1
Heavier, has more body -----	3	2
Has more vitamins, food value -----	3	1
Can make just right amount -----	3	--
Like the flavor better -----	1	9
More economical, low cost -----	--	6
Habit, just do, always have -----	--	5
It doesn't separate, settle -----	--	3
Comes in more varieties -----	--	3
Likes canned and bottled because		
doesn't like frozen -----	--	2
Miscellaneous -----	2	9
Not ascertained -----	4	2
Number of homemakers -----	67	95

1/ Percentages add to more than 100 because some homemakers gave more than one answer.

With the exception of check-box material, office-record information, and free-answer space, the questionnaires used for this study are reproduced below.

U. S. Department of Agriculture  
Agricultural Marketing Service  
Market Surveys Section-MDB-MR

Budget Bureau No. 40-58105  
Expiration Date - Dec. 31, 1958

MD 1-33 -- APPLE JUICE STUDY

W A V E I

Suggested Introduction: Good \_\_\_\_\_. I am \_\_\_\_\_. I am working on a study for the U. S. Department of Agriculture. From this survey, we want to find out about the use of fruit juices in different households. Not fresh -- just the frozen, canned, or bottled.

HAND LIST TO RESPONDENT

1. Will you read down this list and tell me which of these juices you have used in your home in the past year.

ASK FOR EACH JUICE MENTIONED

2. Do you drink \_\_\_\_\_ juice with your meals, between meals, or both?

	Q. 1	Q. 2	When served:	
	juices used	Meal: meals	Between:	Both:
1. Orange	:	:	:	:
2. Grapefruit	:	:	:	:
3. Lemon	:	:	:	:
4. Lime	:	:	:	:
5. Apple	:	:	:	:
6. Grape	:	:	:	:
7. Pineapple	:	:	:	:
8. Tomato	:	:	:	:

If apple juice is not checked (Line 5 of grid), GO TO Q. 7.

If apple juice is checked, ASK:

3. Do all members of your family drink apple juice? Yes  -- GO TO Q. 5 No.

IF NO

4. Who doesn't drink it? (Record the answer in terms of relation to respondent: husband, child, etc.)

5. Do any members of your family like apple juice especially well? Yes  No  -- GO TO Q. 8

IF YES

6. Which ones? GO TO Q. 8

NONUSERS OF APPLE JUICE

On this survey we are especially interested in apple juice.

7. Why is it that you don't serve this juice to your family? (If "some" members don't like it -- ASK: Which ones?)

HOUSEHOLD CHARACTERISTICS

Now I would like to ask you a few questions about yourself and the other people in the household.

- 8. What members of your family are presently living at home? (LIST IN TERMS OF RELATIONSHIP TO RESPONDENT) (What non-family member?)
- 9. Are there any other people who usually eat most of their meals with you?
- 10. What was \_\_\_ age last birthday? \_\_\_\_\_ years
- 11. What was the family's total income last year (1957) before taxes? (USE INCOME CARD) \$ \_\_\_\_\_
- 12. Education: What was the highest grade or years of school you completed? (CIRCLE ONE)  
 Grammar school - - - 1 2 3 4 5 6 7 8 High school - - 1 2 3 4 College - - 1 2 3 4

---

FOR RESPONDENTS ONLY (by observation -- DO NOT ASK) Race: White  Negro  Other   
 Sex: Male  Female

---

W A V E II, III, IV

- 1. What was it about the apple juice that I left last week that made you decide to give it the rating that you did?

If the reply is all favorable ask:

- 1a. Was there anything about it that you didn't like?

If the reply is all unfavorable ask:

- 1b. Was there anything about it that you liked?

- 2. How long did you have the juice I left last week before it was all used up? (days) \_\_\_\_\_  
 (IF STILL ON HAND SEE THAT IT IS DISPOSED OF)

For families with members under 16: ASK  DO NOT ASK

- 3. Did the younger members of the family who didn't use the score cards seem to like the juice I left last week? Yes, all liked  Yes, some liked  No, did not like

W A V E V

- 1. - 3. As above for WAVE II, III, IV
- 4. Did you find that it was inconvenient in any way to mix apple juice from the concentrate?  
 Yes -- In what way? \_\_\_\_\_ No -- Go to Q. 6
- 5. If an apple juice concentrate were sold in the stores where you shop, do you think you would buy it from time to time? Yes -- Go to Q. 7 No -- Why? \_\_\_\_\_
- 6. Would you buy it even if it cost a little more than other brands? Yes, No
- 7. Generally speaking, which do you like better: Juices that have been frozen or juices that come in cans or bottles?







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